SPECTROSCOPIC INVESTIGATION OF A SERIES OF CERIUM-DOPED BORON CLUSTERS

JARRETT MASON, JOSEY E TOPOLSKI, CAROLINE CHICK JARROLD, *Department of Chemistry, Indiana University, Bloomington, IN, USA*.

Rivaled, perhaps, only by its neighbor carbon, boron encompasses a unique and diverse swath of chemistry that lends itself to the adoption of extraordinary characteristics when complexed to metals. In recent years, metal-boride clusters have garnered attention for their potential application in a variety of fields including hydrogen storage and high energy density fuels. As inorganic ligands, these boron clusters tend to prefer multiply aromatic (σ- and π-) electronic configurations which may contribute to their unusual stability and unique properties. In the present study, a series of cerium-boride clusters were interrogated using anion photoelectron spectroscopy as a means of reconciling the presence of a series of mass coincident CeB_x^- (x = 5-7) and $CeO_2B_y^-$ (y = 2-4) clusters as well as elucidating the electronic structure of the anionic and neutral species. Unlike previously studied cerium-oxide clusters, which typically have binding energies around 0.7-1.2 eV, the boride clusters have exhibited greater electron affinities between 1.0-2.0 eV. Moreover, the spectra collected show pronounced vibrational progressions that aid in the analysis of the clusters' molecular structure.